



Data Analytics and Efficiencies in Government

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The terms data analytics, business intelligence and “Big Data” are popular right now in the software industry and within information technology (IT) circles. The promises include the ability to predict outcomes, prevent unwanted events from occurring, and increased insights for more informed decision-making. All of these are true and all are applicable to the requirements and challenges within North Carolina government today. The key to effectively achieving the promise is in identifying the intersection of the most likely areas for success with the ability to leverage the benefits of analytics in day-to-day operations. This paper is focused on this intersection and the lessons learned by both government organizations and private sector enterprises in effectively addressing the inevitable challenges presented by heterogeneous computing environments, budget realities, and organizational impact and disruption. Time to value is an important consideration in this process and this paper will provide recommendations based on experiences from currently deployed solutions to minimize time and maximize value.

President Obama has made clear his desire to eliminate fraud, waste and abuse, or improper payments, and thereby address a problem that the Office of Management and Budget (OMB) has estimated at \$125 billion per year and growing. The President has asked Executive Branch agencies and entitlements recipients to address this problem through proactive efforts to vigilantly cross-reference payments with government-created excluded parties lists as well as by inspecting payments to identify those payments that should not otherwise be made due to error, misuse and abuse, or potential fraud. By applying state-of-the-art data analysis techniques to improper payments and addressing excluded parties payments, departments and agencies can review 100% of payment transactions before the payment is executed, identify potential improper payments, and take action prior to payment. The key is placing the analytic results into the hands of the business process subject matter experts

This approach is successfully employed today at Fortune 500 companies like Pfizer, McDonald's, The Coca-Cola Company, and United Technologies Corporation as well as the United States Department of Defense (DoD), the United States Department of Education (ED), the United States Department of Commerce (DoC), the Georgia Department of Transportation (DOT), state and borough governments, and the United Nations. DoD is monitoring over \$350 billion in vendor payments on an annual basis and currently preventing over \$2 billion per year in potential improper payments before the money is paid. ED is monitoring over \$350 billion in grants and in their first efforts was able to identify nearly 200 improper grants payments out of a total of one million draw downs. And the US Navy has been able to increase automated matching of their disbursements to Treasury outlays by over 50% and reduce manual intervention by 80% while achieving Find Balance with Treasury (FBwT) on a monthly basis for the first time in over 20 years. The Georgia DOT will use CTM to drive more timely reimbursements from funding agencies to reduce their

interest expenses. These organizations are accomplishing this by leveraging new developments in data analytics called continuous transaction monitoring (CTM).

Historically, data analysis has been something performed by specialists with training in data analysis tools. While the tools have made it easier to perform data analysis activities, they have still been only as good as the people using them and require informed strategies for performing individual tests, correlating the results of the tests, reaching conclusions and distributing results to the subject matter experts in a position to address the identified issues. Often, these tools fall victim to the vagaries of various source systems for the data that needs to be analyzed and many times the time and effort required to acquire data is equal to the time required to analyze it. Typically the workflow associated with correcting issues is a completely manual effort. The challenge is transforming this effort into an efficient and continuous process.

As seen in Figure 1, data acquisition is time-consuming and relies on significant manual intervention. IT support for files related to data analysis is generally prioritized fairly low. The actual analysis of data and the resulting review is also manually intense and the quality of the output is directly correlated to the capabilities of the analyst.

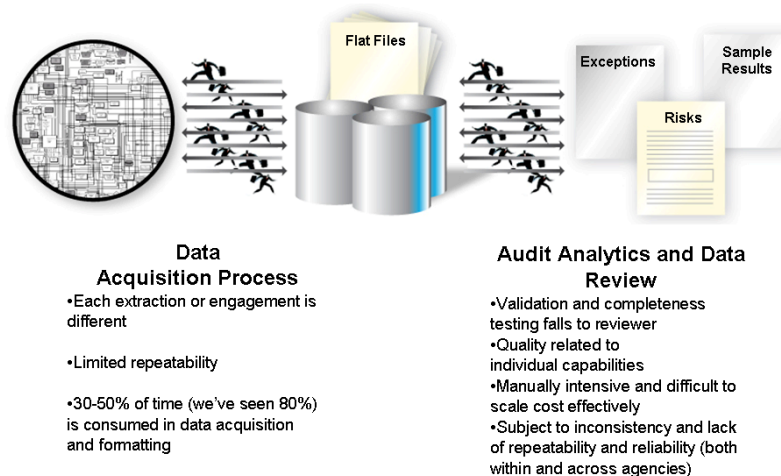


Figure 1. Traditional Data Analysis Challenges

The state-of-the-art in continuous data analysis, CTM, leverages automated techniques for data acquisition and preparation along with automated advanced analysis engines based on artificial intelligence techniques. The key to the new approach to data analysis is that it provides automation, repeatability, reliability, and consistency that have been missing in traditional analysis models, and it provides subject matter experts involved in the day-to-day activities of a business process the opportunity to review, validate, and correct exceptions to the norm.

As seen in Figure 2 below, CTM incorporates structured data automatically where it is processed by an artificial intelligence-based advanced analytics engine. Here, standard libraries of analytics are leveraged to automatically route scored conclusions to subject matter experts for review and disposition. This enables resources most familiar with the issues to address them rather than relying solely on a small group of data analysis experts.

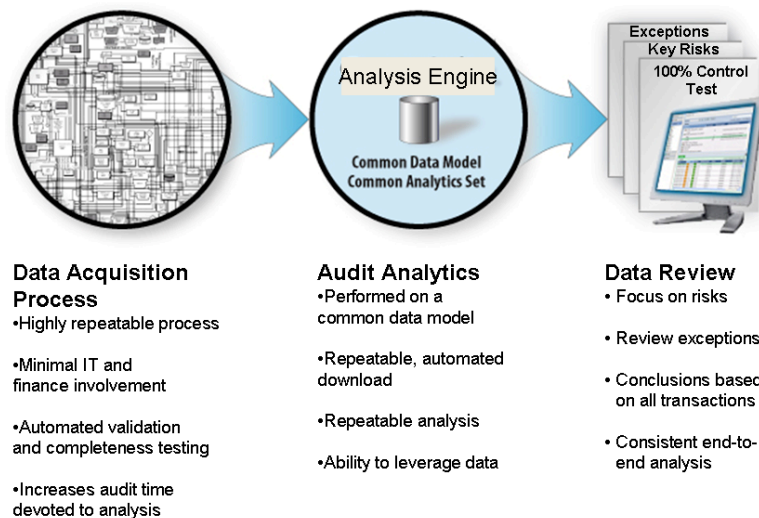


Figure 2. Simplified Data Analytics Model

The key to this state-of-the-art approach is decomposing the payment process into its logical major components.

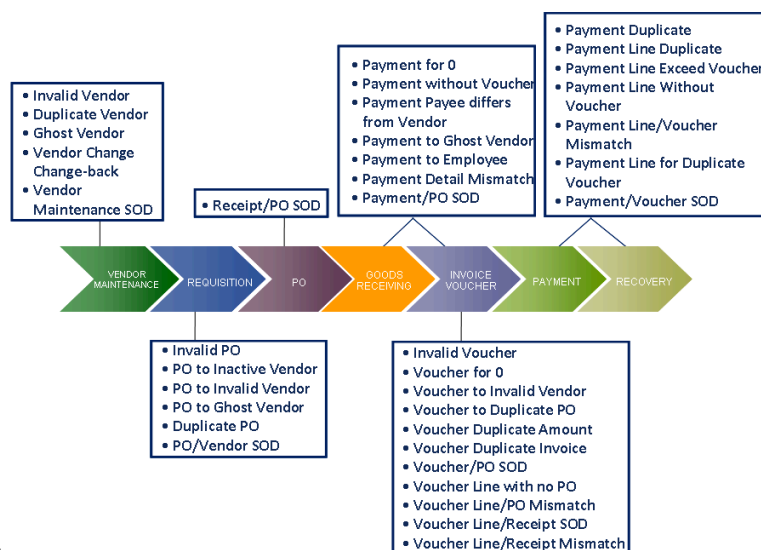


Figure 3. Improper Vendor Payments Analysis

As seen in Figure 3 above, these steps are evaluated to determine what unexpected results could occur at any of the steps in the process, how the unexpected results would be determined, and where is the information available that contributes to knowing that the unexpected result has occurred. For the typical government agency, information to monitor for improper payments will be available in the master vendor file in the agency's payment system along with the purchase orders, invoices, and payments that also reside in the payment system. Additionally, this information will reside in the various excluded parties lists including the GSA Excluded Parties List, the Treasury Debt Check System, the Social Security Administration Death Master, and the Department of Health and Human Services List of Excluded Individuals and Entities.

This approach is well-suited to state government IT environments that, like many of their private sector counterparts, rely on a number of disparate systems with varying data models to operate their financial systems. Because CTM systems can process and analyze any structured data, the potential values in state government are many and varied. Oversight has seen three major areas of value leveraged by local, state, and federal government organizations. These areas include monitoring for fraud, waste, and abuse in vendor payments, unemployment insurance benefits, and Medicaid payments, automating the reconciliation of disbursements, and monitoring for opportunities in performance management.

Leveraging these new data analytics techniques, the lowest hanging fruit is monitoring for fraud, waste, and abuse in government payments. The two major areas where monitoring is best deployed for the shortest time to value include government payments to vendors and government payments to entitlements recipients.

For vendor payments, this means using CTM to automatically identify improper payments such as duplicates, payments to the incorrect vendor, payments for the incorrect amount, credits that have not been applied, and discounts that are available and not taken. CTM can also be used to automatically identify vendors and individual recipients who are ineligible for payments because they are on an excluded parties list or some other condition. Automated data analysis through CTM is also effective for monitoring government payrolls to identify duplicate payments, incorrect payment amounts, and other ineligible payments to employees. Finally, the same payment data can be analyzed to identify opportunities for better sourcing by identifying a purchase order for a specific item at a higher price than paid previously. In addition every vendor purchase can be analyzed for compliance with contracted prices and terms.

Monitoring also provides short time to value opportunities for entitlements payments including unemployment insurance and Medicaid payments. CTM can be used to ensure that only valid and

qualified recipients receive benefits and that benefits paid are accomplished within policy and expectations.

These areas represent opportunities to prevent improper payments ranging in value from 0.1% to 10% of the total expenditures of the area monitored. Payback is measured in months, and in some cases weeks. Areas with strong controls such as vendor payments will likely see results ranging from 0.1-0.5% of the total expenditures. Other expenditure areas with fewer controls like unemployment insurance and Medicaid will see results ranging from 5-10% of total expenditures. Based on our current government experiences, the total annual costs for achieving these results is ranges from 2-7% of total annual prevention. Successful CTM programs begin by targeting program areas with quick paybacks combined with low program risk. In our experience, analyzing and monitoring for improper vendor payments is a cost effective and quick return opportunity to prove the benefit of CTM without assuming risks in the ongoing operation of the program. Government organizations have experienced success by beginning with improper vendor payments and then leveraging lessons learned to move into higher return areas like entitlements.

Leveraging data analytics has historically been challenging for organizations with heterogeneous environments. Because of unique application requirements, varying IT requirements by agency, and rapidly increasing data volumes, governments often wrestle with these challenges. State-of-the-art CTM solutions have cracked the code on these challenges and have streamlined the process for implementing and operating automated data analysis in heterogeneous environments.

CTM solutions leverage sophisticated extraction and mapping technology to automatically acquire data from a variety of commercial-off-the-shelf (COTS), legacy, and custom systems. CTM technologies are also able to acquire data from systems that reside external to the government systems that are being monitored. This means that not only can CTM readily work within heterogeneous government IT environments, but it can also incorporate information from other environments including other states, the federal government, and private sector organizations. Gaining access to relevant data sources is usually a greater challenge for government entities than the process of technically acquiring and analyzing the data. The US Government has taken legislative steps to overcome these challenges by specifically addressing data sharing and access between agencies.

The US Department of Defense in its Defense Finance Accounting Services (DFAS) shared services center has very effectively deployed CTM to incorporate data from four custom legacy payments systems and one COTS payment system (SAP) to monitor 100 percent of its over \$350 billion per year in vendor payments to prevent over \$2 billion per year in improper payments. These results were achieved in the first system in less than 10 weeks and the first four systems –

all custom legacy payment systems – were in production operation in less than six months from the beginning of the project.

The key to effectively applying state-of-the-art CTM capabilities is providing the infrastructure to effectively deploy and maintain the solution, the training and consulting to effectively integrate CTM into the processes used by government agencies, and most importantly, the project management office to manage the ongoing data analysis and monitoring. If the General Assembly were to create a data analytics function, we recommend that it follow the lessons learned and best practices developed from years of experience in the US Government and global leaders in the private sector who have successfully implemented CTM programs and continue to operate on an ongoing basis. A centralized function cannot possibly perform data analysis and respond to analytical results on its own. Rather, a centralized function should serve as a catalyst for the agencies to take action and make improvements in their processes. Success in CTM programs is directly related to the daily use by the subject matter experts within the individual agencies who are most knowledgeable regarding the way the process should work and best able to address exceptions as they are identified.

The key to success is creating a project management office (PMO) with responsibility for identifying analysis and monitoring requirements so that CTM solutions are appropriately configured and customized where required. The PMO should take the lead for identifying specific analysis and monitoring priorities including not only the objectives but also the agencies and priority for implementation. It is also crucial for the PMO to work with agencies to effectively integrate the results of continuous analysis and monitoring in their existing processes. The best resources for addressing unexpected results and for implementing changes based on identified root causes are the organizations responsible for the processes on a day-to-day basis.

Finally, the PMO should work with agencies to identify ways to continually improve analytics and monitoring to adapt to changing conditions and identify new ways to leverage analysis and monitoring. Organizations with effective CTM programs experience continuous increases in the effectiveness and financial returns of their programs through this focus on continuous improvement. An effective PMO function is critical to realizing these results.

To leverage this best practice approach to CTM, the CTM solution must provide for an effective workbench and case management system for subject matter experts in the business processes to quickly review, validate, remediate, and document actions taken to address improper payments that might include potential fraud, waste, and abuse. This allows for those government resources who know the most about the business process and the payments associated with it to be involved in the process of reviewing potential improper payments and taking the actions necessary to

prevent them from occurring. These resources are also the ones best-suited to initiate the process of incorporating the root causes of improper payments into actions to prevent them from recurring.

But establishing a strong PMO function is not the only lesson learned that North Carolina can apply to its objectives. While we all hear and read about the great promise of data analytics, business intelligence, and “Big Data”, the keys to successful implementation and realization of the promise are “eating the elephant one bite at a time” and designing a system that places analytical results in the hands of the people who can make the most of them. At the outset of implementing CTM for analysis and monitoring, it is important to identify the areas of “lowest hanging fruit.” CTM programs can establish early success and long-term confidence by stakeholders by delivering quick time to value. CTM projects should deliver returns on investment (ROI) in as few as three months and no more than six months. These projects need to effectively integrate the business process owners into the process of defining the success criteria, defining the analytics required to meet the monitoring objectives, and ultimately reviewing, validating, and remediating the results generated by the analysis and monitoring system.

In summary, we believe data analysis and monitoring solutions are proven successful and deliver significant value to state and federal governments today.

- Automated continuous analytics and monitoring are reducing fraud, waste, and abuse by preventing improper payments before they occur
- Identifying and addressing improper payments as early as possible when they are less complex and expensive to address save time and expense beyond the value of the payment
- Proven technology is in place at numerous federal government agencies and in other states that demonstrate results that indicate that North Carolina could prevent at least \$100 million per year in improper payments for an annual cost of less than 10 percent of the prevented payments
- The most promising near-term areas of focus are vendor payments and unemployment insurance payments
- A strong PMO focused on prioritizing agencies and working closely with them to establish success criteria and to select the best analytics is critical to program success
- Agency participation is crucial to maximizing return